

# ANTIVIRAL COMPOUNDS AND METHODS OF USING THEREOF

## CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** This application claims the benefit of U.S. Provisional Patent Application Ser. No. 60/884,928, filed 15 Jan. 2007, which is herein incorporated by reference.

## ACKNOWLEDGEMENT OF GOVERNMENT SUPPORT

**[0002]** This invention was made by the United States Army Medical Research and Materiel Command, which is an agency of the United States Government. The Government has certain rights in this invention.

## BACKGROUND OF THE INVENTION

**[0003]** 1. Field of the Invention

**[0004]** The present invention generally relates to antiviral compounds and methods of using thereof.

**[0005]** 2. Description of the Related Art

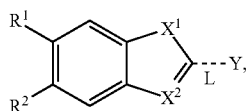
**[0006]** Negative strand RNA viruses (Baltimore classification system) include viruses belonging to the Bornaviridae, Filoviridae, Paramyxoviridae, Rhabdoviridae, Arenaviridae, Bunyaviridae, and Orthomyxoviridae families as well as other unassigned genera. Negative sense RNA viruses include some of the most pathogenic viruses known to human kind, such as the Ebola viruses, Marburg virus, Rift Valley Fever virus, Lassa virus, and Influenzavirus A.

**[0007]** The Ebola viruses, and the genetically-related Marburg virus, are filoviruses associated with outbreaks of highly lethal hemorrhagic fever in humans and primates in North America, Europe, and Africa. The Rift Valley Fever virus, which can cause hemorrhagic fever, killed about 400 people in Kenya in 1998 and thousands in Egypt in 1977 to 1978. The Lassa virus also causes hemorrhagic fever and causes about 5,000 deaths per year. Various strains of Influenzavirus A are known to cause various flu epidemics which have killed thousands of people and the subtype H5N1 is considered as a potential pandemic threat.

**[0008]** Infections by viruses which cause viral hemorrhagic fever usually exhibit initial flu-like symptoms such as fever, vomiting, diarrhea and malaise. Consequently, before a deadly epidemic is suspected and the causative agent is identified, the initial patient(s) are misdiagnosed.

## SUMMARY OF THE INVENTION

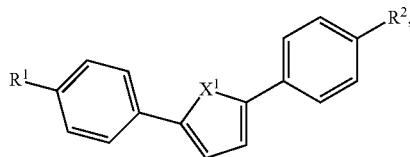
**[0009]** The present invention provides methods of preventing, inhibiting, or reducing the viral activity of a virus on or in a cell or a subject or treating an infection in a cell or a subject caused by a virus which comprises administering to the cell or the subject an effective amount of a compound having a structural formula selected from the group consisting of



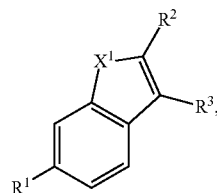
Structural Formula 1

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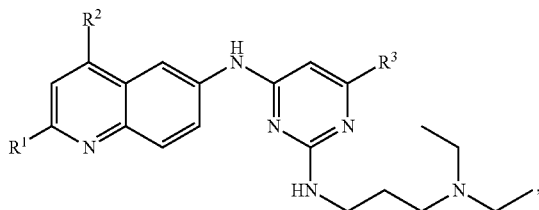
Structural Formula 2



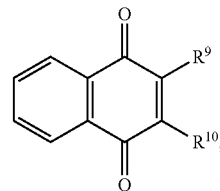
Structural Formula 3



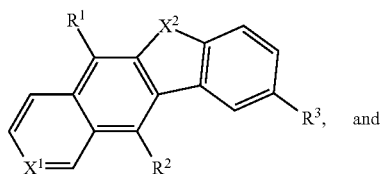
Structural Formula 4



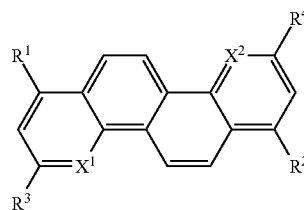
Structural Formula 5



Structural Formula 6



Structural Formula 7



wherein

**[0010]** Y is

